

**PATENT COOPERATION TREATY**  
**PCT**  
**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**  
(Chapter II of the Patent Cooperation Treaty)  
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>FP20791</b>	<b>FOR FURTHER ACTION</b>		See Form PCT/IPEA/416
International application No. <b>PCT/AU2004/001642</b>	International filing date ( <i>day/month/year</i> ) <b>26 November 2004</b>	Priority date ( <i>day/month/year</i> ) <b>9 December 2003</b>	
International Patent Classification (IPC) or national classification and IPC  Int. Cl.  <b>B63B 59/08 (2006.01)</b>			
Applicant  <b>JOHNSON, Keith et al</b>			

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
  - a. ☒ (*sent to the applicant and to the International Bureau*) a total of 10 sheets, as follows:
    - ☐ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
    - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
  - b. ☐ (*sent to the International Bureau only*) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or table related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

<input checked="" type="checkbox"/>	Box No. I	Basis of the report
<input type="checkbox"/>	Box No. II	Priority
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/>	Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/>	Box No. VI	Certain documents cited
<input type="checkbox"/>	Box No. VII	Certain defects in the international application
<input checked="" type="checkbox"/>	Box No. VIII	Certain observations on the international application

Date of submission of the demand <b>8 July 2005</b>	Date of completion of this report <b>27 March 2006</b>
Name and mailing address of the IPEA/AU <b>AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929</b>	Authorized Officer  <b>S.J. DESCHANEL</b> Telephone No. (02) 6283 2368

**Box No. I**      **Basis of the report**

1. With regard to the **language**, this report is based on:

- ☒ The international application in the language in which it was filed
- ☐ A translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3(a) and 23.1 (b))
  - ☐ publication of the international application (under Rule 12.4(a))
  - ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages **1, 2, 7-16** as originally filed/furnished
  - pages\* **3-6A** received by this Authority on **12 January 2006** with the letter of **12 January 2006**
  - pages\* received by this Authority on \_\_\_\_\_ with the letter of \_\_\_\_\_
- ☒ the claims:
- pages as originally filed/furnished
  - pages\* as amended (together with any statement) under Article 19
  - pages\* **17-21** received by this Authority on **12 January 2006** with the letter of **12 January 2006**
  - pages\* received by this Authority on \_\_\_\_\_ with the letter of \_\_\_\_\_
- ☒ the drawings:
- pages **1/5-5/5** as originally filed/furnished
  - pages\* received by this Authority on \_\_\_\_\_ with the letter of \_\_\_\_\_
  - pages\* received by this Authority on \_\_\_\_\_ with the letter of \_\_\_\_\_

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to the sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to the sequence listing (*specify*):

\* If item 4 applies, some or all of those sheets may be marked "superseded."

**Box No. V** Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

Novelty (N)	Claims 1-26	YES
	Claims 27-28	NO
Inventive step (IS)	Claims 1-26	YES
	Claims 27-28	NO
Industrial applicability (IA)	Claims 1-28	YES
	Claims	NO

## 2. Citations and explanations (Rule 70.7)

D1: US 5389266

D2: FR 2700240

D3: FR 2705531

D4: JP 08154559

Novelty (N) claims 1-28

Claims 1-26:

No individual citation or obvious combination of citations discloses a method/apparatus for treating marine growth on a surface as characterised in claims 1-26.

Claims 27-28:

Each of documents D1-D4 discloses an apparatus/method for treating marine growth on a surface as characterised in claims 27-28. D3, for example, discloses a moveable heated housing (26) for the treatment of algae by means of steam.

Inventive step (IS) claims 1-28

As above

All claims meet the requirements of industrial applicability.

**Box No. VIII**    **Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

There is no continuity between page 2 and new page 3. It would appear that the first line of page 3 is missing.

# PATENT COOPERATION TREATY

From the:  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

Griffith Hack  
GPO Box 4164  
SYDNEY NSW 2001

## PCT

NOTIFICATION OF TRANSMITTAL OF  
INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(Chapter II of the Patent Cooperation Treaty)

(PCT Rule 71.1)

Date of mailing  
(day/month/year)

30 MAR 2006

Applicant's or agent's file reference  
FP20791

### IMPORTANT NOTIFICATION

International application No.  
PCT/AU2004/001642

International filing date (day/month/year)  
26 November 2004

Priority date (day/month/year)  
9 December 2003

Applicant

JOHNSON, Keith et al

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translations to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

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amount of energy that will be required to heat all the water in a chamber surrounding a large hull may be prohibitive.

Soviet patent publication no. SU 119-924A discloses a method of treating algae on a hull by, firstly, shrouding at least part of the hull in an insulating jacket and then heating the hull from a heat exchanger fitted to the inside of the hull. The heat from the hull is transferred through to the algal growth. Once the algae has been killed, the insulating jacket may be removed.

This arrangement requires the positioning of an insulating jacket about a hull, which may be difficult (particularly for large vessels). It also further supposes that there is access to the inside of the hull to heat the inside of the hull so that the heat is transferred to the outside of the hull. It may be difficult in many vessels to obtain access to enough of the inside of the hull to allow effective treatment of the algae.

20

#### Summary of the Invention

In accordance with a first aspect, the present invention provides a method of treating marine growth on a surface, including the steps of confining a volume adjacent a portion of the surface, introducing a heated fluid into the volume to heat the marine growth, moving the confined volume over the surface to treat other portions of the surface, and retaining the confined volume adjacent the surface regardless of the orientation of the surface.

Note that the term "marine growth", as used in this document, covers any animal or vegetable matter that may grow on any water-going object and is not limited to

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organisms which only occur in the sea. The term also includes organisms which occur in inland waterways and lakes.

In an embodiment, the heated fluid is at a  
5 temperature sufficient to kill the marine growth.

In an embodiment, the fluid is heated remotely and passed into the volume from the remote location. Heated fluid may be exhausted from the confined volume as further heated fluid is introduced to the confined volume. The  
10 heated fluid may be exhausted into the surrounding environment.

In an embodiment, a depth dimension of the confined volume is relatively small in magnitude. The heated fluid introduced into the confined volume may form a layer over  
15 the portion of the surface, the layer being of relatively small thickness. Advantageously, this is energy efficient as it means that the amount of heated fluid required to treat the surface is minimised, and therefore the amount of energy utilised is minimised. The actual depth  
20 dimension will in many cases depend upon the magnitude of the confined volume which may vary from application to application. In the embodiment, however, the depth dimension may be in a range of 2-50mm, in an alternative embodiment in a range of 2-15mm, in a further alternative  
25 embodiment in a range of 2-10mm.

The method includes the step of retaining the confined volume adjacent the surface. The volume is retained regardless of the orientation of the surface. If the surface is a ship's hull, for example, the hull will  
30 usually be orientated facing sideways or downwards into the water and the confined volume is retained adjacent the hull. In an embodiment, magnetism is used to retain the volume adjacent the surface.

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In an embodiment, the confined volume is moved over the surface it is conformed to the shape of the surface. If the shape is curved, for example, the confined volume may conform with the curved shape, so as to maintain the  
5 volume adjacent the surface.

In an embodiment, the method may be applied to treat a surface in situ. For example, if the surface is a ship's hull, then the method may be applied to treat the ship's hull below the water line.

10 In accordance with a second aspect, the present invention provides an apparatus for treating marine growth on a surface, including a confinement arrangement arranged to confine a volume adjacent a portion of the surface, the confinement arrangement being provided with an entry port  
15 arranged to enable introduction of a heated fluid to the volume, the confinement arrangement being movable over the surface to enable treatment of other portions of the surface, and the confinement arrangement further including a retaining means which is arranged to retain the  
20 confinement arrangement proximate the surface so that the volume remains adjacent the surface, regardless of the orientation of the surface.

The confinement arrangement is provided with a retaining means which is arranged to retain the  
25 confinement arrangement proximate the surface so that the volume remains adjacent the surface. In one embodiment, the retaining means includes one or more magnets mounted to the confinement arrangement.

In an embodiment, an exhaust means enables heated  
30 fluid that has been introduced into the volume to be exhausted from the volume. The exhaust means may exhaust the heated fluid into the surrounding environment. In an



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embodiment, the exhaust means is a flexible seal which borders the confinement arrangement.

In an embodiment, the confinement arrangement is in the form of a cover having a back and sides and an open  
5 face, between them forming a cavity. The open face is arranged to be positioned against the surface to be treated, edges of the sides abutting the surface. The confined volume is defined within the cavity within the cover. The sides, in an embodiment, are formed at least  
10 partially of a flexible skirt which forms a loose seal against the surface in operation. In an embodiment, the thickness of the cover is of relatively small magnitude so that the volume of water required to treat the area is relatively low. The water may form a layer over the  
15 portion of the surface being treated.

In an embodiment, the confinement arrangement is arranged to conform with the shape of the surface as it is moved over the surface. In one embodiment, where the confinement arrangement is in the form of a cover, the  
20 cover is flexible so that it can conform with, for example, a curved surface such as the hull of a water-going vessel. In one embodiment, the cover is made of a number of plates linked together so that they can move relative to each other so that overall the cover is  
25 flexible and able to conform with an uneven surface.

In accordance with a third aspect, the present invention provides an apparatus for treating marine growth on a surface, including a housing for mounting a heating means to enable heating of a portion of the surface, and a  
30 retaining means arranged to retain the housing proximate the surface, the housing arrangement being moveable over

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the surface to enable treatment of other portions of the surface.

In an embodiment, the heating means may include a heat exchanger. In an embodiment, the retaining means

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CLAIMS

1. A method of treating marine growth on a surface,  
including the steps of confining a volume adjacent a  
5 portion of the surface, introducing a heated fluid into  
the volume to heat the marine growth, moving the confined  
volume over the surface to treat other portions of the  
surface, and retaining the confined volume adjacent the  
surface regardless of the orientation of the surface.  
10
2. A method in accordance with Claim 1, wherein the step  
of retaining the volume adjacent the surface is carried  
out utilising magnetism.
- 15 3. A method in accordance with any one of the preceding  
claims, including the further step of exhausting heated  
fluid from the confined volume as further heated fluid is  
introduced to the confined volume.
- 20 4. A method in accordance with Claim 3, wherein the  
heated fluid is exhausted into the surrounding  
environment.
5. A method in accordance with any one of the preceding  
25 claims, wherein the confined volume has a relatively small  
depth dimension.
6. A method in accordance with Claim 5, wherein the  
heated fluid forms a layer over the portion of the  
30 surface.

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7. A method in accordance with Claim 6, wherein the depth dimension of the confined volume is in the range of 2 to 50mm.

5 8. A method in accordance with Claim 7, wherein the depth dimension is in the range of 2 to 15mm.

9. A method in accordance with Claim 8, wherein the depth dimension is in the range of 2 to 10mm.

10

10. A method in accordance with any one of the preceding claims, including the further step of varying the temperature of the heated fluid during treatment, whereby to determine the most effective temperature.

15

11. A method in accordance with any one of the preceding claims, including the further step of varying a rate of introduction of the heated fluid during treatment, whereby to determine the most effective rate.

20

12. A method in accordance with any one of the preceding claims, wherein the surface is a surface of a hull of a water-going craft.

25 13. A method in accordance with Claim 12, wherein the treatment is carried out under the water line of the craft while the craft is in the water.

30 14. A method in accordance with any one of the preceding claims, comprising the further step of conforming the confined volume to the shape of the surface as the confined volume is moved over the surface.

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15. An apparatus for treating marine growth on a surface, including a confinement arrangement arranged to confine a volume adjacent a portion of the surface, the confinement arrangement being provided with an entry port  
5 arranged to enable introduction of a heated fluid to the volume, the confinement arrangement being movable over the surface to enable treatment of other portions of the surface, and the confinement arrangement further including a retaining means which is arranged to retain the  
10 confinement arrangement proximate the surface so that the volume remains adjacent the surface, regardless of the orientation of the surface.
16. An apparatus in accordance with Claim 15, wherein the  
15 retaining means includes one or more magnets mounted to the confinement arrangement.
17. An apparatus in accordance with claims 15 or 16, the confinement arrangement further including an exhaust means  
20 enabling heated fluid that is being introduced into the volume to be exhausted from the volume.
18. An apparatus in accordance with Claim 17, the exhaust means including a flexible seal which borders the  
25 confinement arrangement.
19. An apparatus in accordance with any one of claims 15 to 18, the confinement arrangement further being arranged to conform with the shape of the surface as it is moved  
30 over the surface.
20. An apparatus in accordance with Claim 19, wherein the confinement arrangement includes a flexible cover.

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21. An apparatus in accordance with Claim 20, wherein the flexible cover includes a number of relatively rigid components linked together so that they can move relative to each other to facilitate flexibility of the cover.

22. An apparatus in accordance with any one of Claims 15 to 21, wherein the confinement arrangement is such that the confined volume has a relatively small depth dimension.

23. An apparatus in accordance with Claim 22, wherein the confinement arrangement is such that the heated fluid introduced into the confined volume forms a layer over the portion of the surface.

24. An apparatus in accordance with Claim 23, wherein the depth dimension is in a range of 2 to 50mm.

25. An apparatus in accordance with Claim 24, wherein the depth dimension is in a range of 2 to 15mm.

26. An apparatus in accordance with Claim 25, wherein the depth dimension is in a range of 2 to 10mm.

27. An apparatus for treating marine growth on a surface, including a housing for mounting a heating means to enable heating of a portion of the surface, and a retaining means arranged to retain the housing proximate the surface, the housing arrangement being moveable over the surface to enable treatment of other portions of the surface.

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28. A method of treating marine growth on a surface,  
including the steps of utilising a heating arrangement to  
heat a portion of the surface, retaining the heating  
arrangement against the surface and moving the heating  
5 arrangement over the surface to treat other portions of  
the surface.